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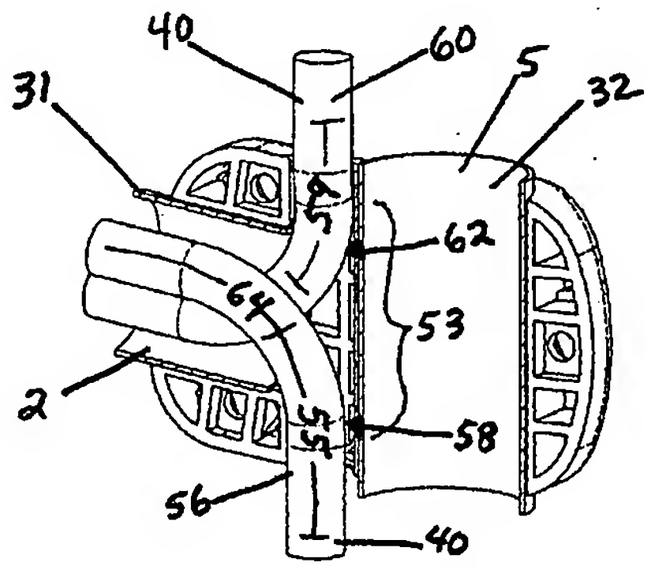

(57) Abstract: Embodiments of the inventive technology may be coupler apparatus such as pivot couplers that may couple a non-horizontal item support rail to a rail support leg and that may enable rotatable motion of a coupled rail about a substantially vertical axis (13); rails may be coupled at an angle other than ninety degrees. Couplers may include compression elements that may establish a cable channel adapted to direct one or more cables in a desired manner, such as to within the interior of a coupled rail at an end of that rail. The coupler apparatus may have application in support stands such as musical instrument (e.g., drum) support apparatus.

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SUPPORT MEMBER COUPLING METHODS AND APPARATUS

This is an international application that claims benefit of and priority to United States Provisional Application, 60/536,791, filed January 14, 2004, incorporated herein by reference.

TECHNICAL FIELD

The technical field to which embodiments of the inventive technology relate is a coupler apparatus as may be used in a larger item support apparatus. Specific embodiments relate to support of instruments, including musical instruments such as percussion instruments.

DISCLOSURE OF INVENTION

Generally, the inventive technology disclosed herein relates to a novel and useful coupler apparatus that may be used in, e.g., a stand for the support of items including but not limited to percussion instruments that might be found as part of a drum set. More specifically, an aspect of the inventive technology may involve coupler apparatus such as pivot couplers that may couple a non-horizontal item support rail to a rail support leg and that may enable rotatable motion of a coupled rail about a substantially vertical axis 13; rails may be coupled at an angle other than ninety degrees. Couplers may include compression elements that may establish a cable channel adapted to direct one or more cables in a desired manner, such as to within the interior of a coupled rail at an end of that rail.

BACKGROUND

Some considerations relative to the use of percussion instrument support racks will be discussed to facilitate an understanding of the relevant technology. Typically, a percussion instrument support rack (a type of item support rack) will include rails and legs that support the rails. The rails themselves, which may have in other descriptions been referred to as tiers, may serve as attachment sites and provide support for percussion

instruments (whether directly in the case where the percussion instrument is attached directly to the rail, or indirectly in the case where a riser or other attachment structure is attached to the rail and a percussion instrument is attached to the riser). Sometimes it may be appropriate to position all instruments at substantially the same height, but more often tradition or practicality requires placement of several instruments at varying heights above the supporting base (e.g., a floor). Most specifically in the case of percussion instruments, it is traditional as well as practically desirable to position the instruments so that they collectively follow first a rising sweep from left to center left and then smoothly transition or arch at center to a falling sweep from center right to right, allowing the user to play ascending and descending percussion patterns with ease. Of course, the terms center, left and right are with respect to a user of the instruments (e.g., a drummer), where center could be essentially that position that the user would face in assuming a position in preparation to use all the instruments. Other preferred placements of instruments might call for a variation or even a reversal of this sweep of instruments or might require a more abrupt change from a rising to a falling rail axis.

Another desirable function or attribute or characteristic of multi-railed instrument stands that at least partially surround a player is the ability to be adjusted for radial distance from the user. Since the stand partially surrounds the user, merely moving the stand closer to or farther away from the user in a single direction will result in an off-center user position, which is often detrimental to good instrument access in other directions. Thus it may be important in some applications that the radius of the arc approximated by the rail array (as projected on a horizontal plane), or a portion of that arc, be adjustable. It should also be noted that the commonly practiced placement of larger percussion instruments on one side of the user and smaller instruments on the other side of the user might require that the rail array more closely approximate (again, in its projection onto a horizontal plane) a segment of a spiral of expanding radius in order to maintain a more constant distance between the user and the inner edge of the supported instruments. Such a use may require that the relative horizontal angle of an outer rail to its adjacent inner rail be different for the left outer rail than for the right outer rail.

In providing or establishing pivot axes for radial or spiral horizontal rail array adjustment, it is important to understand the effects of non-verticality of the pivot axes. If such a pivot axis is not vertical, an outer rail end, while being pivoted about this axis, does not move in a horizontal arc, and thus the height of at least a portion of it changes

Such pivoting may raise or lower any leg attached to the rail under adjustment (e.g., to the outer end of the rail). In cases where the total number of legs is greater than three, this height change will result in a detrimental condition of non-coplanarity of the several legs' lower ends (feet) – the legs will no longer all contact the floor and will require significant additional adjustments to bring all feet back into contact with the floor. Additionally, this height change and/or the secondary adjustments needed to compensate for it can result in unintentional vertical tilting of the rail array (e.g., tilting in towards or out from a drummer seated in the center of the array), which may require yet more adjustment to correct. For these and perhaps other reasons, it may be desirable to provide and maintain vertical pivot axes for the inner ends of outer rails.

Yet another desirable function of instrument support racks may be the directing of cables (e.g., powering or signal cables in the case where supported instruments are electronic drums) through an interior space defined by (e.g., within) a rail, from one point on the rail to another, e.g., from an end of the rail to the other, or from one end of a rail to a termination point or a point of ingress or egress at an intermediate location along the rail or rail span (as but a few examples). In this way signal and/or power cables associated with supported instruments can be hidden from view for a portion of their length, improving the stand's appearance and reducing tangling and snagging of cables during use, transport or storage.

Where a hollow member (e.g., a tube) is used as a rail, it is of course possible to create holes or ports in the rail sidewall at both ends of the rail, through which cables can pass. However, this practice requires a costly secondary aperture operation (e.g., drilling) to be performed at each end of the rail, and may require the use of a costly junction box or grommet or baffle to make the holes visually acceptable and/or noninjurious to the cables. Further, it may reduce the length of the portion of the rail to which instruments can be attached. Additionally, by removing load-carrying material from the rail, holes in the rail sidewalls create stress risers, compromising the rail's mechanical structure at the very locations at which it may need to be strongest - the end joints.

One might also wish to consider the use of holes in the legs for passing cables out the end opening of one rail and into the end opening of the next rail without exiting the stand structure. But a little thought shows the difficulty this practice would create with respect to rail horizontal angle adjustment or collapse for transport or vertical rail end

height adjustment, as any of these may cause a shearing action between the rail end and edges of the hole in the leg which could cause cables to be cut, damaged, or at least stressed. Further, once again a structural member, in this case the leg, would have its strength and stiffness compromised by a major interruption in its load-bearing structure.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following descriptions, the terms rear and front are intended relative to a user of the apparatus. Thus, a front view would show the front of a user of the apparatus, if that user were shown in the figure.

Fig. 1a shows a plan view of an embodiment of the inventive support apparatus in a fully extended configuration.

Fig. 1b(1) shows a side view of a coupler designed to retain an arm to which may be attached a riser or instrument.

Fig. 1b(2) shows a side view of an embodiment of two inventive coupler apparatus.

Fig. 1b(3) shows a side view of a foot of an embodiment of the inventive support apparatus.

Fig. 1c shows a side view of an embodiment of the inventive support apparatus having two center support tiers and in fully extended configuration.

Fig. 2 shows front view of an embodiment of the inventive support apparatus in a typical set-up (deployed) configuration.

Fig. 3 shows a side view of an embodiment of the inventive support apparatus in a typical set-up configuration.

Fig. 4 shows perspective front views of an embodiment of two inventive support apparatus in a typical set-up configuration..

Fig. 5 shows a side view of an embodiment of the inventive support apparatus with risers attached thereto and in a typical set-up configuration.

Fig. 6 shows a perspective aerial view of an embodiment of the inventive support apparatus with risers attached thereto and in a typical set-up configuration.

Fig. 7 shows a perspective aerial view of an embodiment of the inventive support apparatus in a typical set-up configuration.

Fig. 8 shows a front view of an embodiment of the inventive support apparatus in a typical set-up configuration, and with risers attached thereto and instruments attached to some of the risers.

Fig. 9 shows a photograph of an embodiment of the inventive support apparatus in a typical set-up configuration with percussion instruments attached either directly to tiers or to risers that are attached directly to tiers.

Fig. 10 shows an exploded view of an embodiment of the inventive coupler apparatus.

Fig. 11 shows an embodiment of compression elements that form parts of the inventive coupler apparatus.

Fig. 12a and 12c show views of the inside of an embodiment of one of the compression elements, in addition to cables established against it.

Fig. 12b shows an embodiment of a coupler apparatus (in addition to a cutaway view of cables passing therethrough) as viewed from where a riser that would be retained by it would be established.

Fig. 13 shows a perspective view of two compression elements of the inventive coupler apparatus established in an oppositely facing orientation.

Fig. 14 shows a view of part of a rail support leg and of a coupler apparatus (in addition to a cutaway view of cables passing therethrough) as viewed from where a riser that would be retained by it would be established.

Fig. 15 shows a view of a portion of a rail support leg, an item support rail, and one of the compression elements of an embodiment of the coupler apparatus that couples the rail support leg to the item support rail, in addition to cables passing therethrough.

MODES FOR CARRYING OUT THE INVENTION

As mentioned above, the present inventive technology includes a variety of aspects, which may be combined in different ways. The following descriptions are provided to list elements and describe some of the embodiments of the present inventive technology. These elements are listed with initial embodiments, however it should be understood that they may be combined in any manner and in any number to create additional embodiments. The variously described examples and preferred embodiments should not be construed to limit the present inventive technology to only the explicitly described systems, techniques, and applications. Further, this description should further be understood to support and encompass descriptions and claims of all the various embodiments, systems, techniques, methods, devices, and applications with any number of the disclosed elements, with each element alone, and also with any and all various permutations and combinations of all elements in this or any subsequent application.

Figures 1 – 8 show support apparatus 1 in accordance with embodiments of the inventive technology. The embodiments covered by the claims are not limited to the embodiments shown in the figures. The figures show item support rails 2 (e.g., musical instrument support rails, such as percussion instrument support rails 4) and rail support legs 5 coupled to these support rails by couplers 6 (also referred to as coupler apparatus).

In embodiments shown, the rail support legs have lower ends 7 adapted to rest on a lower supporting surface (e.g., a floor, such as a stage floor). Further, after disattachment of any risers 8 and instruments 9 that may be attached directly to the apparatus or risers, the support apparatus may be collapsible such that in its collapsed configuration it occupies a smaller volume. It is of note that the instruments may be attached to the risers or the rails by instrument attachment devices.

An item support rail 2 (again, a broad term that includes, inter alia, a percussion instrument support rail 4) is typically an elongated member (e.g., a tube or pipe or bar,

whether hollow or not), may exhibit any of several cross-sections (e.g., circular, oval, polygonal, hexagonal, rectangular, non-circular annular, and/or square, whether referring to the outer surface of a non-hollow member or a hollow member, as but a few examples), and may be straight or curved (which includes curved in some sections and straight in other(s)). A support rail may curve outward as in Fig. 2. For purposes of clarity of description, item support rails may be described as having a left end and a right end, where such nomenclature is relative to a user of the apparatus of which the rails form a part (e.g., a seated drummer at least partially surrounded by the drum set rack). Where there are more than two item support rails in a single apparatus, the outer rails 10 (e.g., the furthest left and the furthest right) may be referred to as peripheral item support rails, while the other rail(s) may be referred to as center item support rail(s) 12.

It should be understood that an item support rail 2 which, in an installation configuration (e.g., when the support apparatus is set up as intended, on a horizontal lower surface), has any portion which is at an elevation that is different from that of a remaining portion of that rail is a non-horizontal item support rail 11 (n.b., the term non-horizontal as used in this term modifies the rail, not the item). A non-horizontal rail, as defined herein, may be, e.g., curved, straight, stepped (even with horizontal sections) or exhibit a combination of two or more of these characteristics. It should be pointed out that a non-horizontal rail can have ends substantially at the same height.

The rail support legs 5, to each of which may be coupled one or more item support rails, may also be elongated, and may exhibit any of several cross-sectional shapes (e.g., circular, oval, polygonal, hexagonal, rectangular, non-circular annular, square, and/or C shaped, whether referring to the outer surface of a non-hollow member or a hollow member, as but a few examples). One or more rails may be coupled to a rail support leg. The legs may be straight or curved (a curved leg may have straight section(s)). A leg may define a substantially vertical axis 13 (e.g., the leg may itself have a vertical centerline 14) which may be the same as an axis about which a pivot coupler (e.g., a pivot coupler apparatus) allows rotation of a coupled rail (rotation does not require a full rotation, as a mere sweep of a few degrees is deemed rotation). It should be noted that a straight, vertical rail support leg 15 is a type of straight rail support leg. Further, any of the legs may be height adjustable upon manipulation of a leg height adjustment apparatus 16 such as a clamp.

Particular embodiments of the inventive technology may include a left, percussion instrument support rail 20 supported by a furthest left, rail support leg 21 and a center left, rail support leg 22; a center, percussion instrument support rail 23 supported by the center left, rail support leg 22 and a center right, rail support leg 24; and a right, percussion instrument support rail 25 supported by the center right, rail support leg 24 and a furthest right, rail support leg 26. Each rail may be coupled to its respective rail support legs by couplers. Of course, such particular embodiments are only certain of the many embodiments within the ambit of the inventive technology.

It should be understood that the inventive technology includes not only inventive apparatus but also inventive methods (e.g., support methods), which may include steps such as "establishing at least one item support rail as a non-horizontal item support rail". This limit may include positioning a straight or curved, item support rail as a non-horizontal item support rail, which step may be effected upon appropriate coupling of the rail.

It is also of note that one application of the inventive technology is musical instrument support and, in particular, percussion instrument support. Percussion instruments that may be supported by the apparatus include, but are not limited to, drums, high hats, and cymbals. Percussion instruments may be attached directly to not only the rails, but also the legs (e.g., the upper portion of the legs).. They may instead be attached directly to risers that attach directly to a rail or leg. As mentioned, the apparatus and methods may find application not only to musical instrument support, but also to the more general field of item support. Items supported include, but are not limited to percussion instruments and indeed anything that one might want to establish in a manner similar to drums of a drum set for display or use.

Figures 9-14 show types of coupler apparatus 17. The aforementioned coupler (also shown as part of the support apparatus in Figs. 1-8) relates to this specific type of coupler apparatus 17. It should be understood, of course, that these figures relate only to certain embodiments of the broader inventive coupler apparatus technology, which includes within its ambits the apparatus shown in the figures in addition to apparatus that are not shown but otherwise adequately described.

The couplers shown include pivot couplers 18 that may enable rotatable motion of

the rail about a substantially vertical axis 13 (such rotatable motion may first require manipulation of the coupler by a user, although this is not a requirement for all embodiments). Substantially vertical axes includes those axes that are from approximately 85 – 95 degrees relative to a horizontal supporting floor that the axis passes through. This vertical axis may be defined by a rail support leg (e.g., the axis may be substantially the same as a centerline defined by the leg) and/or the pivot coupler (e.g., the axis may pass through the substantial center of an opening 19 of the coupler through which the coupled leg passes).

It should be understood that each the term "coupler" or "coupler apparatus" is a broad term that includes an apparatus that is operable to, e.g., sufficiently retain one member in substantially fixed position relative to another member coupled thereto. A coupler may be releasable to release retained members and/or perhaps to allow rotation of one or both of the retained members relative to the other; it may be detachable from the apparatus of which it forms a part, although these features are not necessarily implied by the use of the term. Of course, a coupler may directly contact retained members at ends or at parts other than their ends.

In their typical application, the couplers would couple structural support members (which play a role in providing support as desired), and thus could be properly characterized as structural support member coupler apparatus. When the structural support members that they couple are part of a musical instrument support apparatus (e.g., a drum stand), they may be referred to as musical instrument structural support member coupler apparatus or, more specifically, percussion instrument structural support member coupler apparatus.

Typically, two or more couplers will couple each rail to rail support legs (e.g., one coupler per attachment). Of course, a coupled item support rail is an item support rail that is coupled (e.g, to a rail support leg) by a coupler. These couplers may be located anywhere along the length of a rail, such as at either end thereof. Any of these couplers may be pivot couplers 18 that pivotally couple a rail to a rail support leg, enabling rotatable motion of the rail (perhaps such rotatable motion can take place only after manipulation of the coupler and/or application of a sufficient torque to the rail). This rotatable motion may be about a substantially vertical axis, and it may be that such motion is possible only after manipulation of the coupler (e.g., unscrewing screws or disengaging

a clamping lever) to release the coupler, although, again, this is not a requirement. Any of the couplers may enable height adjustment of a coupled rail. This height adjustment may be substantially purely vertical translatory height adjustment (e.g., where the rail is attached to two legs and the couplers, perhaps upon release, enable the rail to be raised or lowered vertically, without any rotation or component of horizontal motion of the rail). However, this height adjustment may instead be of a different nature (e.g., substantially no elevation change in the rail at one of the couplers but instead a rotation about a horizontal axis passing through that coupler and concomitant elevation changes at different parts of the rail).

Any coupler may couple a rail to a leg at an angle (e.g., a relative angle) other than ninety degrees 19 (e.g., 95 degrees, 85 degrees, 92 degrees, 87 degrees, as but a few of many examples). Of course, it may be this feature that allows a coupled non-horizontal item support rail to rotate about a vertical axis (e.g., one that passes through a pivot coupler).

It should also be noted that any of the legs (or indeed, even any of the rails) may be extended or shortened at any point along their lengths by a telescoping mechanism such as a collar clamp 16. Of course, such a mechanism would afford an often desirable manner of adjustment.

A coupler apparatus may comprise a first compression element 27; a second compression element 28; and at least one compression enhancement element 29. These first and second compression elements, when (a) being established in an oppositely facing orientation 30 at least partially around two members to be retained 31, 32 (so as to establish a compression configuration 30 of the coupler apparatus), and (b) when sufficiently compressed towards one another upon operation of the at least one compression enhancement element, may retain in substantially fixed relation the two members (e.g., an item support rail and rail support leg) to be retained. One of the members to be retained (e.g., the rail) may have a terminus 34 (e.g., a rail end) between the first and the second compression elements when the compression elements are established in the compression configuration, and that terminus may define an terminus interface 35. Further, the first and the second compression elements, when established in the compression configuration, may establish a cable channel 36 adapted to direct at least one cable from outside 37 of the first and second compression elements to through the

terminus interface. The compression elements may be attached (e.g., via a hinge) or detached (e.g., not connected) from one another prior to their establishment in the compression configuration. The compression elements may be substantially identical such that each is a substantial compression element half, or, of course, they can be dissimilar.

The cable channel may establish at least one cable port 38 that is open to the environment external the compression elements 37 when they are in their compression configuration. Each cable port may have a diameter that is less than that of any cable end connectors 39 that may be located at the end of the cable 40 that is to pass through the port. There may be an upper cable port 41 and a lower cable port 42 in those embodiments where there is more than one cable port. Where there are two cables, the cables may cross 43 (e.g., one behind the other) substantially at their intersection with the terminus interface. This interface may be hidden from view when the compression elements are established in a compression configuration.

The compression enhancement elements may include a wide variety of devices, structures or features, such as at least one nut 44 and at least one bolt 45, a compression lever arm, clasps, elastic securing devices, a toothed strap and lever, as but a few examples.

The coupler apparatus may be an item support structure parts coupler apparatus 46 (e.g., an apparatus that retains in substantially fixed relative position two or more parts of an item support structure such as an item support apparatus). More specifically, it may be a percussion instrument support structure parts coupler apparatus 47 (e.g., an apparatus that retains in substantially fixed relative position two or more parts of a percussion instrument support structure such as a percussion instrument support apparatus). Where the coupler apparatus retains an item support rail in substantially fixed position relative to a rail support leg, the coupler apparatus may be an item support rail and rail support leg coupler apparatus.

The item support rails, rail support legs and the couplers may be fabricated of any variety of materials, including, but not limited to: steel, metal, plastic, composite materials, fiberglass, and/or alloy, as but a few examples. The rails, legs and couplers need not be of the same material, of course. All parts or elements can be made from any of a variety of well known manufacturing methods, including but not limited to injection

molding, molding, die casting, extrusion, roll forming, welding, turning, stamping, drilling and/or piercing, to name a few.

A coupling method may comprise the steps of: positioning a terminus of an item support rail in a desired retention position 48 relative to a rail support leg to which it is to be retained; establishing a first compression element against a first side 49 of the item support rail terminus and a portion 50 of the rail support leg that is proximate the terminus 34; establishing a length 51 of each of all of the at least one cable exiting the terminus in a channel portion 63 in a desired cable installation position 53; establishing a second compression element 28 against a second side 54 of the item support rail terminus and a portion 50 of the rail support leg that is proximate the terminus 34; enhancing the compression effected by the compression elements on the terminus and the portion of the rail support leg that is proximate the terminus; and retaining the terminus of the item support rail in the desired retention position relative to the rail support leg to which it is to be retained. It should be noted that the step of "enhancing the compression effected by the compression elements" may involve screwing a bolt into a nut, operating a lever, or manipulating an elastic device, as but a few examples. Further, it may be that a step takes place as a result of the performance of an earlier or simultaneous step (e.g., the step of "retaining..." may take place as a result of the performance of the step of "enhancing the compression..."). The step of establishing a length of each of all of the at least one cable exiting the terminus in a channel or channel portion in a desired cable installation position may comprise the step of establishing a portion 55 of a first cable 56 in a first channel portion 57 in a first desired position 58 and establishing a portion 59 of a second cable 60 in a second channel portion 61 in a second desired position 62.

Another coupling method may comprise the steps of: establishing a first portion 64 of a first cable 56 within at least a portion 65 of a first structural support member 66 so as to situate the first portion of the first cable in a desired cable installation position 67; establishing a terminus 68 of the first structural support member in a desired installation position 69 relative to a second structural support member 72; establishing a second portion 70 of the first cable in a desired cable installation position 71 relative to the second structural support member; establishing a coupler apparatus 17 substantially around at least portions of opposite sides 73 of: the terminus of the first structural support member, the second structural support member, and the first cable; and retaining the first structural support member and the second structural support member in fixed relative position,

where the first cable has two termini 74, and where the coupling method does not comprise the step of pulling either of the termini of the first cable through the coupler apparatus after the performance of the step of establishing a coupler apparatus substantially around at least portions of opposite sides of: the terminus of the first structural support member, the portion of the second structural support member, and the second portion of the first cable. Additionally, the method may comprise the steps of establishing a first portion 75 of a second cable 76 within at least a portion 65 of the first structural support member 66 so as to situate the first portion of the second cable in a desired cable installation position 77; and establishing a second portion 78 of the second cable in a desired cable installation position 79 relative to the second structural support member, in addition to other steps described in the claims.

It should be noted that the step of retaining the first structural support member and the second structural support member in fixed relative position may comprise the step of compressing the coupler apparatus. Also, the step of establishing a first portion of a first cable within at least a portion of a first structural support member so as to situate the first portion of the first cable in a desired cable installation position may involve the pulling of the cable. It is also of note that a coupler apparatus can hold two members in fixed relative position and still allow those members to be moved (e.g., rotated) relative to each other, but perhaps only upon application of a sufficient force or torque, maybe after manipulation of a device or part(s) such as a compression enhancement element.

It should also be understood that the term "desired installation position" can be used relative to different parts, and indicates that position in which it is desired that the referenced part be upon installation effected by completion of the coupling method. However, because the installation that takes place upon completion of the method might not leave the cables in their final installation position (e.g., that position desired when all of the drums, e.g., are attached (either directly or with risers) to the rails or legs), it may be necessary to pull cable through the installed compression elements to its desired location. Thus, a cable can be established in its "desired cable installation position" and still be pulled to a final desired position (e.g., relative to a surrounding structural support member), as long as any cable end terminations, including connectors at the ends (which typically have diameters that are greater than that of the cable) need not be, and are not, pulled through the coupler apparatus. As is clear from this discussion, when the term cable installation position is used, the installation referred to need not be the final

installation occurring after the items supported (e.g., the percussion instruments) are attached (either directly or indirectly) to the item support rails and rail support legs.

As can be easily understood from the foregoing, the basic concepts of the present invention may be embodied in a variety of ways. It involves (but is not limited to) both support and attachment techniques as well as devices to accomplish the appropriate support or attachment. In this application, the support or attachment techniques are disclosed as part of the results shown to be achieved by the various devices described and as steps which are inherent to utilization. They are simply the natural result of utilizing the devices as intended and described. In addition, while some devices are disclosed, it should be understood that these not only accomplish certain methods but also can be varied in a number of ways. Importantly, as to all of the foregoing, all of these facets should be understood to be encompassed by this disclosure.

The discussion included in this patent application is intended to serve as a basic description. The reader should be aware that the specific discussion may not explicitly describe all embodiments possible; many alternatives are implicit. It also may not fully explain the generic nature of the invention and may not explicitly show how each feature or element can actually be representative of a broader function or of a great variety of alternative or equivalent elements. Again, these are implicitly included in this disclosure. Where the invention is described in device-oriented terminology, each element of the device implicitly performs a function. Apparatus claims may not only be included for the device described, but also method or process claims may be included to address the functions the invention and each element performs. Neither the description nor the terminology is intended to limit the scope of the claims that will be included in any subsequent patent application.

It should also be understood that a variety of changes may be made without departing from the essence of the invention. Such changes are also implicitly included in the description. They still fall within the scope of this invention. A broad disclosure encompassing both the explicit embodiment(s) shown, the great variety of implicit alternative embodiments, and the broad methods or processes and the like are encompassed by this disclosure and may be relied upon when drafting the claims for any subsequent patent application. It should be understood that such language changes and broader or more detailed claiming may be accomplished at a later date (such as by any

required deadline) or in the event the applicant subsequently seeks a patent filing based on this filing. With this understanding, the reader should be aware that this disclosure is to be understood to support any subsequently filed patent application that may seek examination of as broad a base of claims as deemed within the applicant's right and may be designed to yield a patent covering numerous aspects of the invention both independently and as an overall system.

Further, each of the various elements of the invention and claims may also be achieved in a variety of manners. Additionally, when used, the term "element" is to be understood as encompassing individual as well as plural structures that may or may not be physically connected. This disclosure should be understood to encompass each such variation, be it a variation of an embodiment of any apparatus embodiment, a method or process embodiment, or even merely a variation of any element of these. Particularly, it should be understood that as the disclosure relates to elements of the invention, the words for each element may be expressed by equivalent apparatus terms or method terms -- even if only the function or result is the same. Such equivalent, broader, or even more generic terms should be considered to be encompassed in the description of each element or action. Such terms can be substituted where desired to make explicit the implicitly broad coverage to which this invention is entitled. As but one example, it should be understood that all actions may be expressed as a means for taking that action or as an element which causes that action. Similarly, each physical element disclosed should be understood to encompass a disclosure of the action which that physical element facilitates. Regarding this last aspect, as but one example, the disclosure of a "support" should be understood to encompass disclosure of the act of "supporting" -- whether explicitly discussed or not -- and, conversely, were there effectively disclosure of the act of "supporting", such a disclosure should be understood to encompass disclosure of a "support" and even a "means for supporting" Such changes and alternative terms are to be understood to be explicitly included in the description.

Any acts of law, statutes, regulations, or rules mentioned in this application for patent; or patents, publications, or other references mentioned in this provisional application for patent are hereby incorporated by reference. In addition, as to each term used it should be understood that unless its utilization in this application is inconsistent with such interpretation, common dictionary definitions should be understood as incorporated for each term and all definitions, alternative terms, and synonyms such as

contained in the Random House Webster's Unabridged Dictionary, second edition are hereby incorporated by reference. Finally, all references listed in the list of References To Be Incorporated By Reference In Accordance With The Provisional Patent Application or other information statement filed with the application are hereby appended and hereby incorporated by reference, however, as to each of the above, to the extent that such information or statements incorporated by reference might be considered inconsistent with the patenting of this/these invention(s) such statements are expressly not to be considered as made by the applicant(s).

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Thus, the applicant(s) should be understood to have support to claim and make a statement of invention to at least: i) each of the devices (including support and attachment devices) as herein disclosed and described, ii) the related methods disclosed and described, iii) similar, equivalent, and even implicit variations of each of these devices and methods, iv) those alternative designs which accomplish each of the functions shown as are disclosed and described, v) those alternative designs and methods which accomplish each of the functions shown as are implicit to accomplish that which is disclosed and described, vi) each feature, component, and step shown as separate and independent inventions, vii) the applications enhanced by the various systems or components disclosed, viii) the resulting products produced by such systems or components, ix) each system, method, and element shown or described as now applied to any specific field or devices mentioned, x) methods and apparatuses substantially as described hereinbefore and with reference to any of the accompanying examples, xi) the various combinations and permutations of each of the elements disclosed, and xii) each potentially dependent claim or concept as a dependency on each and every one of the independent claims or concepts presented.

With regard to claims whether now or later presented for examination, it should be understood that for practical reasons and so as to avoid great expansion of the examination burden, the applicant may at any time present only initial claims or perhaps only initial claims with only initial dependencies. Support should be understood to exist to the degree required under new matter laws -- including but not limited to European Patent Convention Article 123(2) and United States Patent Law 35 USC 132 or other such laws-- to permit the addition of any of the various dependencies or other elements presented under one independent claim or concept as dependencies or elements under any other independent claim or concept. In drafting any claims at any time whether in this application or in any subsequent application, it should also be understood that the applicant has intended to capture as full and broad a scope of coverage as legally available. To the extent that insubstantial substitutes are made, to the extent that the applicant did not in fact draft any claim so as to literally encompass any particular embodiment, and to the extent otherwise applicable, the applicant should not be understood to have in any way intended to or actually relinquished such coverage as the applicant simply may not have been able to anticipate all eventualities; one skilled in the

art, should not be reasonably expected to have drafted a claim that would have literally encompassed such alternative embodiments.

Further, if or when used, the use of the transitional phrase "comprising" is used to maintain the "open-end" claims herein, according to traditional claim interpretation. Thus, unless the context requires otherwise, it should be understood that the term "comprise" or variations such as "comprises" or "comprising", are intended to imply the inclusion of a stated element or step or group of elements or steps but not the exclusion of any other element or step or group of elements or steps. Such terms should be interpreted in their most expansive form so as to afford the applicant the broadest coverage legally permissible.

Finally, any claims set forth at any time are hereby incorporated by reference as part of this description of the invention, and the applicant expressly reserves the right to use all of or a portion of such incorporated content of such claims as additional description to support any of or all of the claims or any element or component thereof, and the applicant further expressly reserves the right to move any portion of or all of the incorporated content of such claims or any element or component thereof from the description into the claims or vice-versa as necessary to define the matter for which protection is sought by this application or by any subsequent continuation, division, or continuation-in-part application thereof, or to obtain any benefit of, reduction in fees pursuant to, or to comply with the patent laws, rules, or regulations of any country or treaty, and such content incorporated by reference shall survive during the entire pendency of this application including any subsequent continuation, division, or continuation-in-part application thereof or any reissue or extension thereon.

CLAIMS:

What is claimed is:

1. A coupler apparatus comprising:

- a first compression element;
- a second compression element; and
- at least one compression enhancement element;

wherein said first and said second compression elements,:

(a) when established in a compression configuration upon being established in an oppositely facing orientation at least partially around two members to be retained, and

(b) when sufficiently compressed towards one another upon operation of said at least one compression enhancement element,

retain in substantially fixed relation said two members to be retained,

wherein one of said members to be retained has a terminus between said first and said second compression elements when said compression elements are established in said compression configuration,

wherein said terminus defines a terminus interface, and

wherein said first and said second compression elements, when established in said compression configuration, establish a cable channel adapted to direct at least one cable from outside of said first and second compression elements to through said terminus interface.

2. A coupler apparatus as described in claim 1 wherein said first and second compression elements are disattached from one another prior to their establishment into said compression configuration.

3. A coupler apparatus as described in claim 1 wherein said coupler apparatus retains said two members at a relative angle of other than ninety degrees.

4. A coupler apparatus as described in claim 1 wherein one of said members does not have a terminus between said first and said second compression elements when said compression elements are established in said compression configuration.

5. A coupler apparatus as described in claim 4 wherein said cable channel is substantially parallel to said one of said members that does not have a terminus between said first and said second compression elements when said compression elements are established in said compression configuration.

6. A coupler apparatus as described in claim 4 wherein said cable channel adapted to direct at least one cable from outside of said first and second compression elements to through said terminus interface is adapted to direct at least one cable from outside said one of said members that does not have a terminus between said first and said compression elements when said compression elements are established in said compression configuration.

7. A coupler apparatus as described in claim 1 wherein said coupler apparatus allows rotation of one of said members relative to the other upon either loosening of the coupler apparatus and application of a sufficient torque or application of a sufficient torque.

8. A coupler apparatus as described in claim 1 wherein said cable channel has two openings through which one or more cable may pass from outside of said first and second compression elements to through said terminus interface.

9. A coupler apparatus as described in claim 1 wherein said cable channel is substantially vertical when said compression elements are established in said compression configuration.

10. A coupler apparatus as described in claim 1 wherein said cable channel establishes at least one cable port open to the environment external said compression elements when in said compression configuration.

11. A coupler apparatus as described in claim 10 wherein said at least one cable port has a diameter that is less than the diameter of any cable end connectors.

12. A coupler apparatus as described in claim 10 wherein said cable channel establishes a first cable port and a second cable port.

13. A coupler apparatus as described in claim 12 wherein said first cable port is an upper cable port.

14. A coupler apparatus as described in claim 12 wherein said second cable port is a lower cable port.

15. A coupler apparatus as described in claim 12 wherein each said cable port is adapted to direct only one cable.

16. A coupler apparatus as described in claim 15 wherein said cable channel directs two cables to through said terminus interface.

17. A coupler apparatus as described in claim 16 wherein said two cables cross substantially at their intersection with said terminus interface.

18. A coupler apparatus as described in claim 1 wherein said terminus is hidden from view when said compression elements are established in said compression configuration.

19. A coupler apparatus as described in claim 1 wherein said at least one compression enhancement elements comprises at least one nut and at least one bolt.

20. A coupler apparatus as described in claim 1 wherein said at least one compression enhancement elements comprises a compression lever arm.

21. A coupler apparatus as described in claim 1 wherein said at least one compression enhancement elements comprises clasps.

22. A coupler apparatus as described in claim 1 wherein each of said compression elements is a substantial compression element half.

23. A coupler apparatus as described in claim 1 wherein said coupler apparatus comprises an item support structure parts coupler apparatus.

24. A coupler apparatus as described in claim 23 wherein said item support structure parts coupler apparatus comprises a musical instrument support structure parts coupler apparatus.

25. A coupler apparatus as described in claim 24 wherein said musical instrument support structure parts coupler apparatus comprises a percussion instrument support structure parts coupler apparatus.

26. A coupler apparatus as described in claim 25 wherein said percussion instrument support structure parts coupler apparatus comprises a percussion instrument rail and rail support leg coupler apparatus.

27. A coupling method comprising the steps of:

- positioning a terminus of an item support rail in a desired retention position relative to a rail support leg to which it is to be retained;
- establishing a first compression element against a first side of said item support rail terminus and a portion of said rail support leg that is proximate said terminus;
- establishing a length of each of all of the at least one cable exiting said terminus in a channel portion in a desired cable installation position;
- establishing a second compression element against a second side of said item support rail terminus and a portion of said rail support leg that is proximate said terminus;
- enhancing the compression effected by said first and second compression elements on said terminus and said portion of said rail support leg that is proximate said terminus; and
- retaining said terminus of an item support rail in said desired retention position relative to said rail support leg to which it is to be retained.

28. A coupling method as described in claim 27 wherein said step of retaining said terminus of an item support rail in said desired retention position relative to said rail support leg to which it is to be retained takes place after said step of establishing all of the at least one cable exiting said terminus in a channel portion in a desired installation position.

29. A coupling method as described in claim 27 wherein said coupling method establishes a coupler apparatus at least partially around said terminus of an item support rail and said portion of said rail support leg.

30. A coupling method as described in claim 29 wherein said coupling method does not comprise the step of pulling cables through said coupler apparatus.

31. A coupling method as described in claim 27 wherein said step of establishing a second compression element comprises the step of establishing at least one channel port open to the environment external said compression elements after they each are established.

32. A coupling method as described in claim 27 further comprising the step of enabling rotation of said item support rail relative to said rail support leg.

33. A coupling method as described in claim 27 wherein said step of establishing a second compression element hides said terminus of said item support rail from view.

34. A coupling method as described in claim 27 wherein said step of establishing a length of each of all of the at least one cable comprises the step of establishing a portion of a first cable in a first channel portion in a first desired position and establishing a portion of a second cable in a second channel portion in a second desired position.

35. A coupling method as described in claim 34 wherein said first channel portion is above said second channel portion.

36. A coupling method as described in claim 27 wherein said step of positioning a terminus of an item support rail in a desired retention position relative to a rail support leg to which it is to be retained comprises the step of position said terminus at an angle other than ninety degrees relative to said rails support leg.

37. A coupling method as described in claim 27 wherein said step of enhancing the compression effected by said first and second compression elements comprises the step of screwing a bolt

38. A coupling method as described in claim 27 wherein said step of enhancing the compression effected by said first and second compression elements comprises the step of operating a lever

39. A coupling method comprising the steps of:

- establishing a first portion of a first cable within at least a portion of a first structural support member so as to situate said first portion of said first cable in a desired cable installation position;
- establishing a terminus of said first structural support member in a desired installation position relative to a second structural support member;
- establishing a second portion of said first cable in a desired cable installation position relative to said second structural support member;
- establishing a coupler apparatus substantially around at least portions of opposite sides of: said terminus of said first structural support member, a portion of said second structural support member, and said second portion of said first cable; and
- retaining said first structural support member and said second structural support member in fixed relative position,

wherein said first cable has two termini, and

wherein said coupling method does not comprise the step of pulling either of said termini of said first cable through said coupler apparatus after said step of establishing a coupler apparatus substantially around at least portions of opposite sides of: said terminus of said first structural support member, said portion of said

second structural support member, and said second portion of said first cable is performed.

40. A coupling method as described in claim 39 w said step of retaining said first structural support member and said second structural support member in fixed relative position comprises the step of compressing said coupler apparatus

41. A coupling method as described in claim 39 wherein said steps are performed in the order as presented.

42. A coupling method as described in claim 39 further comprising the step of enabling rotation of said first structural support member relative to said second structural support member

43. A coupling method as described in claim 39 further comprising the step of establishing a first portion of a second cable within at least a portion of said first structural support member so as to situate said first portion of said second cable in a desired cable installation position.

44. A coupling method as described in claim 43 further comprising the step of establishing a second portion of said second cable in a desired cable installation position relative to said second structural support member.

45. A coupling method as described in claim 44 further comprising the step of establishing said coupler apparatus substantially around at least portions of opposite sides of: said second portion of said second cable.

46. A coupling method as described in claim 45 wherein said second cable has two termini.

47. A coupling method as described in claim 46 wherein said coupling method does not comprise the step of pulling either of said cable termini of said second cable through said coupler apparatus after said step of establishing said coupler apparatus substantially around at least portions of opposite sides of: said second portion of said second cable is performed.

48. A coupling method as described in claim 39 wherein said first structural support member is an item support rail and said second structural support member is a rail support leg.

49. A coupling method as described in claim 48 wherein said item support rail is a percussion instrument support rail.

50. A coupling method as described in claim 49 further comprising the percussion instruments supported by said instrument support rail.

51. A coupling method as described in claim 48 further comprising the items supported by said item support rail.

52. A coupling method as described in claim 39 wherein said step of compressing said coupler apparatus so as to hold said first structural support member and said second structural support member in fixed relative position comprises the step of screwing a bolt

53. A coupling method as described in claim 39 wherein said step of compressing said coupler apparatus so as to hold said first structural support member and said second structural support member in fixed relative position comprises the step of operating a lever

FIG. 1a

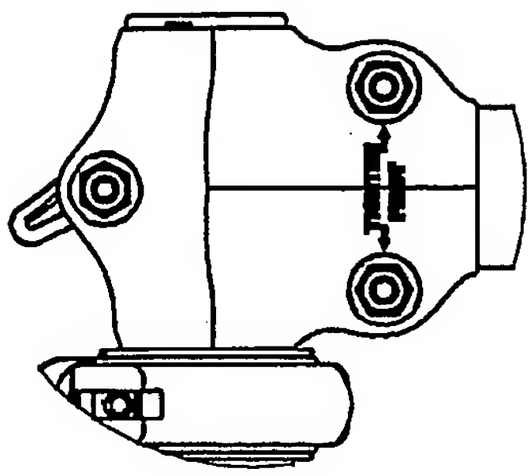

FIG. 1b(1)

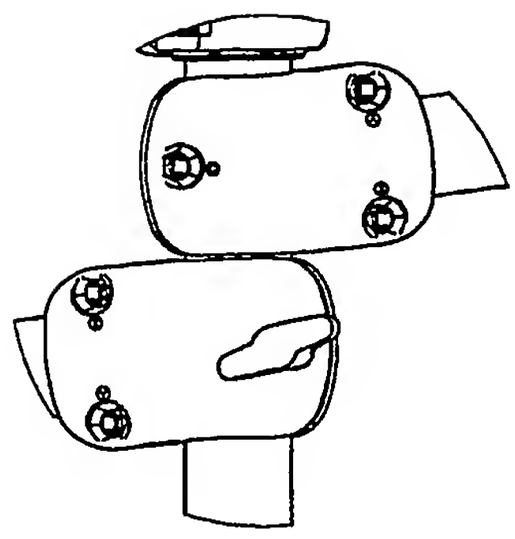

FIG. 1b(2)

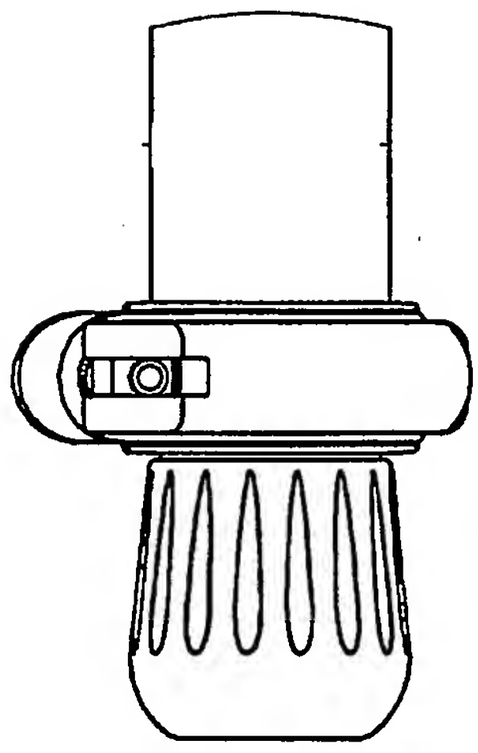

FIG. 1b(3)

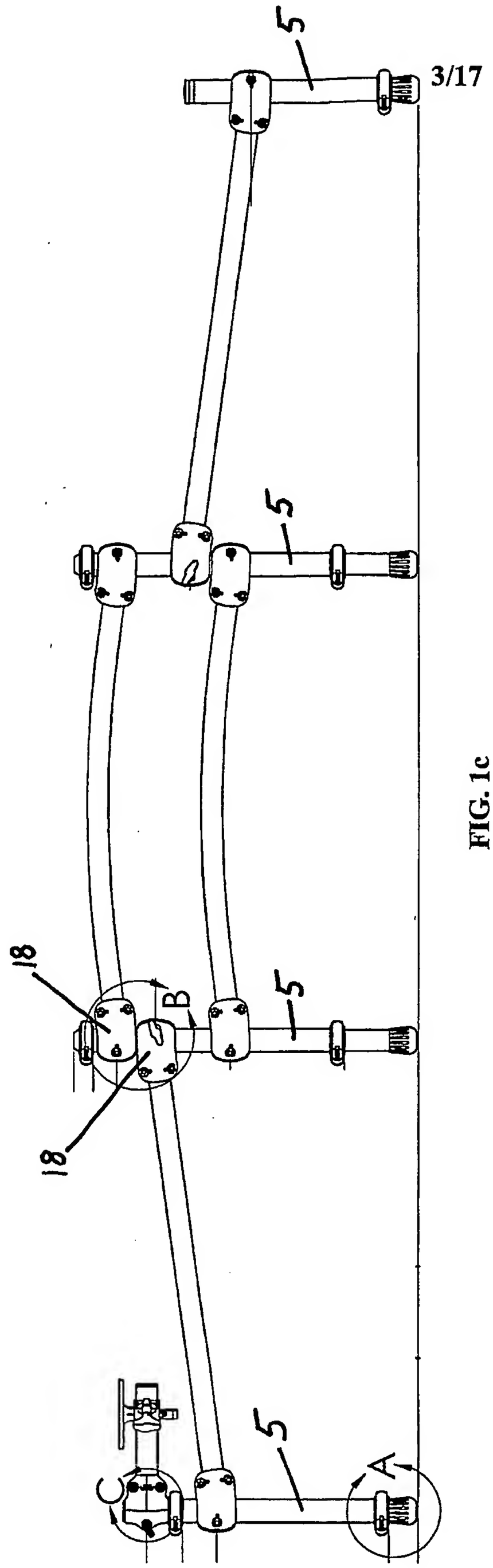

FIG. 1c

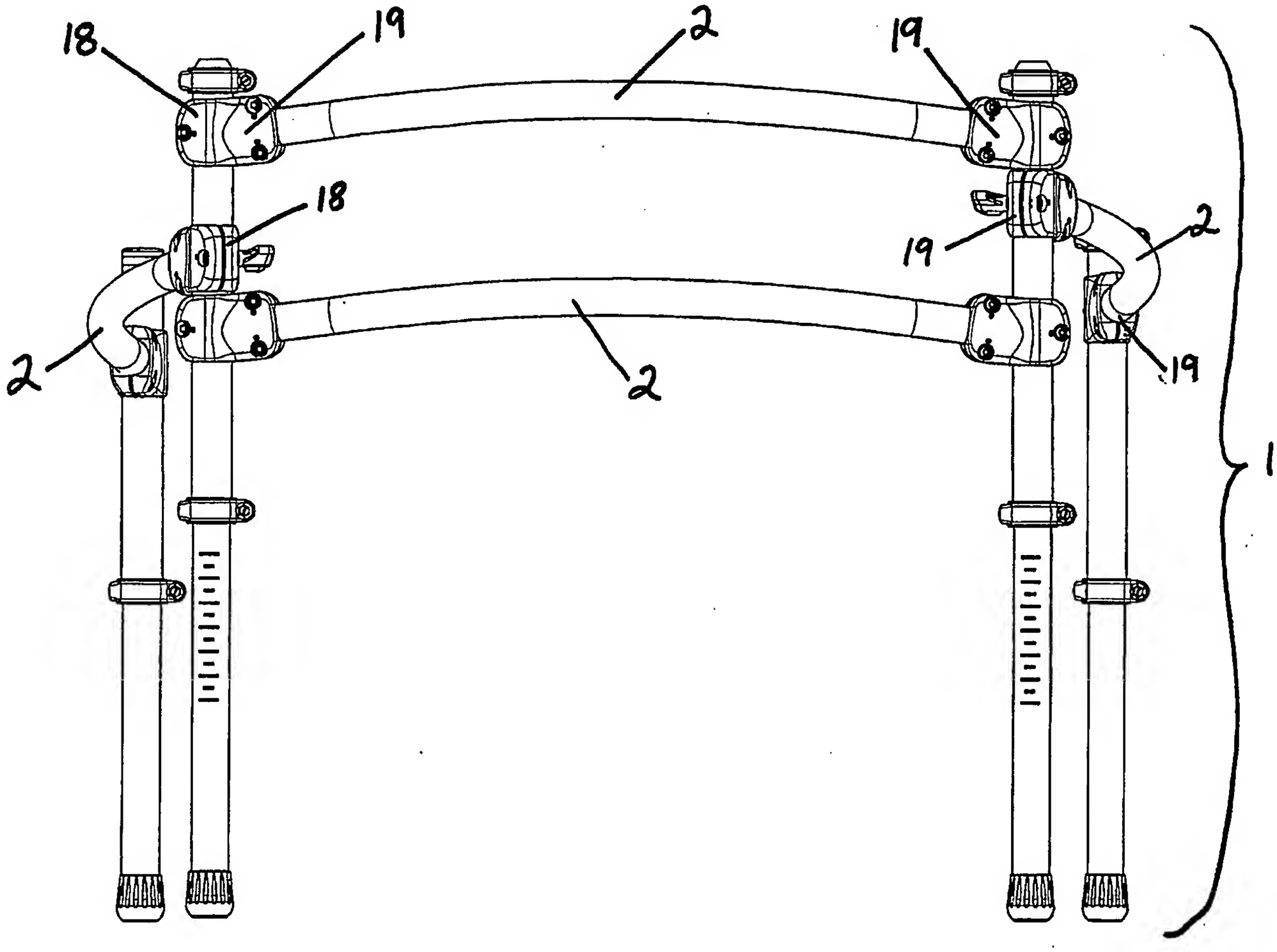

FIG. 2

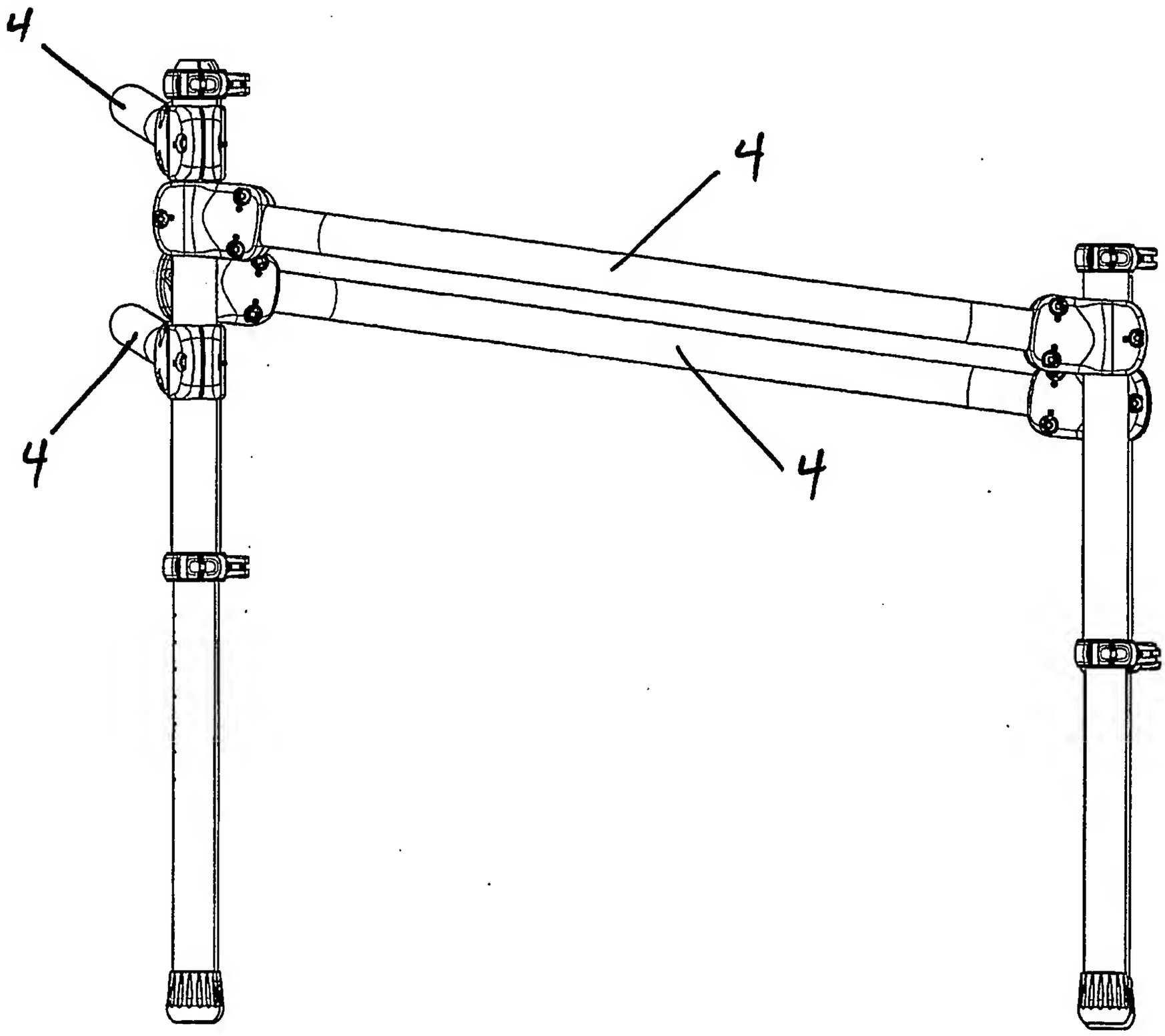

FIG. 3

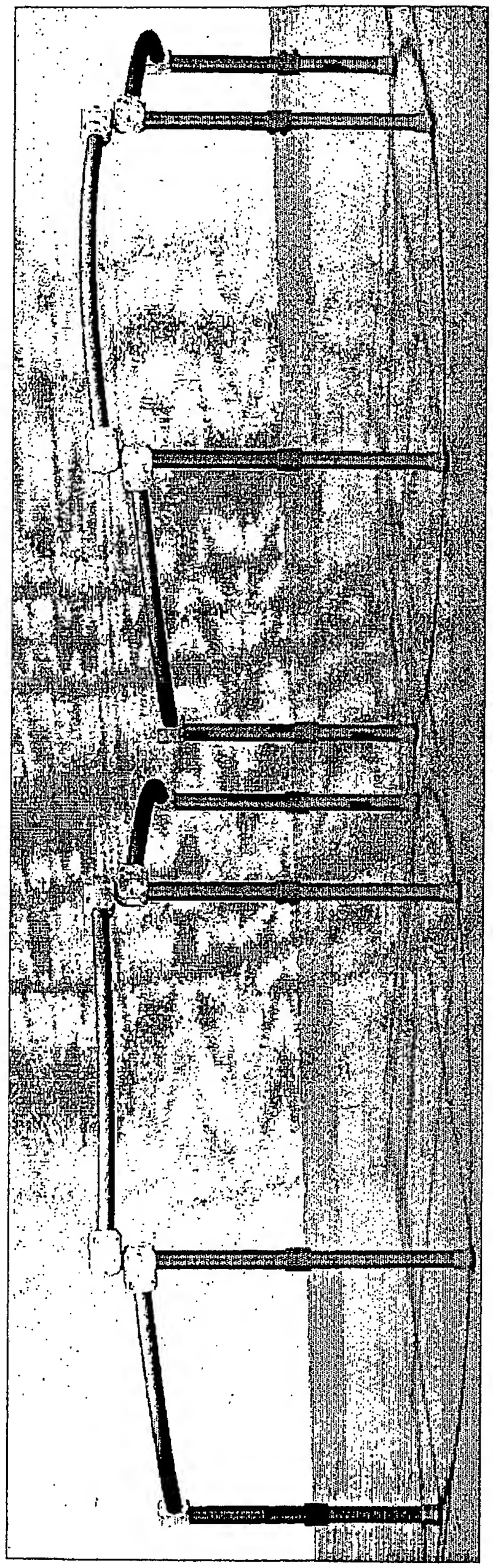

FIG. 4

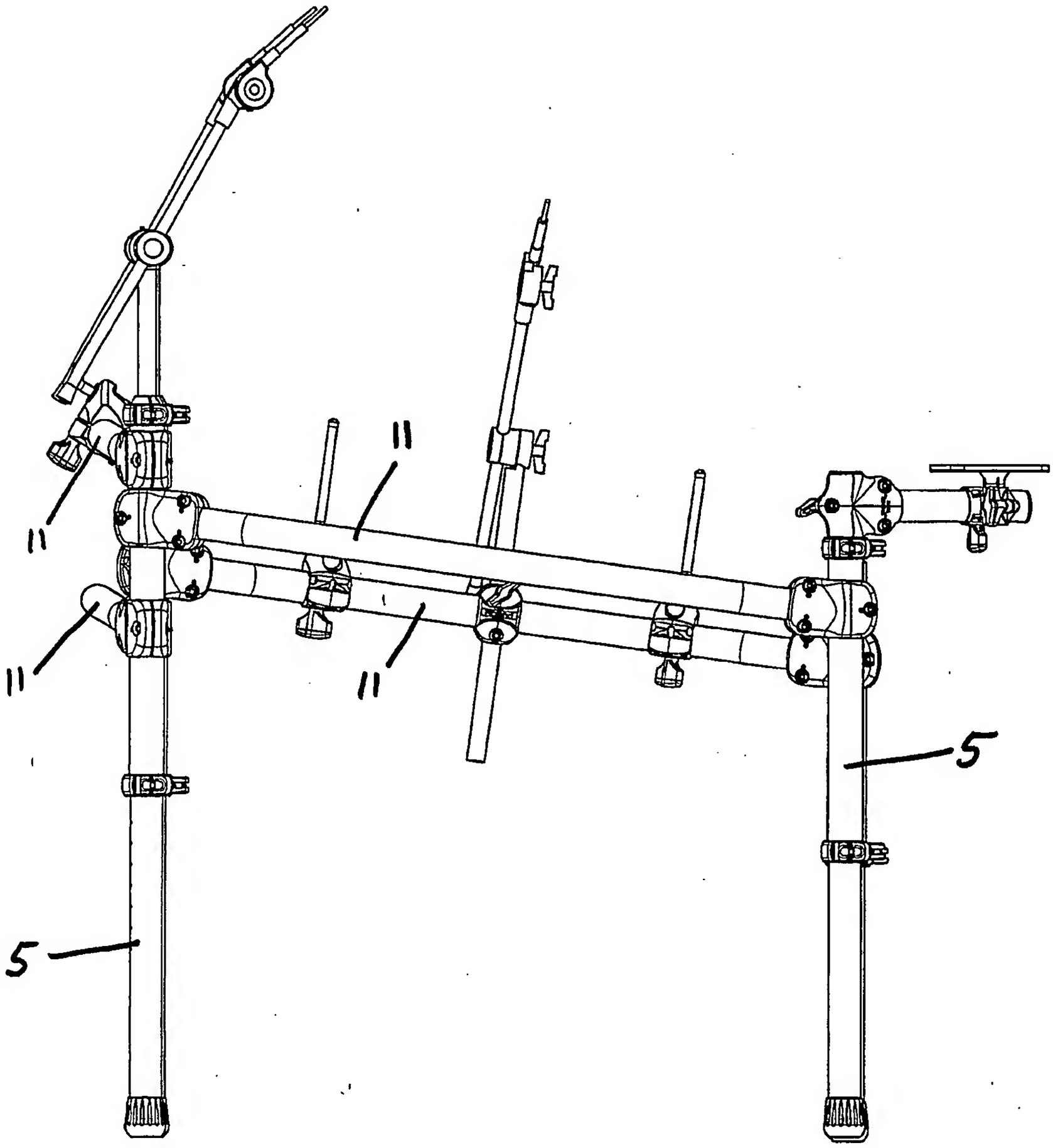

FIG. 5

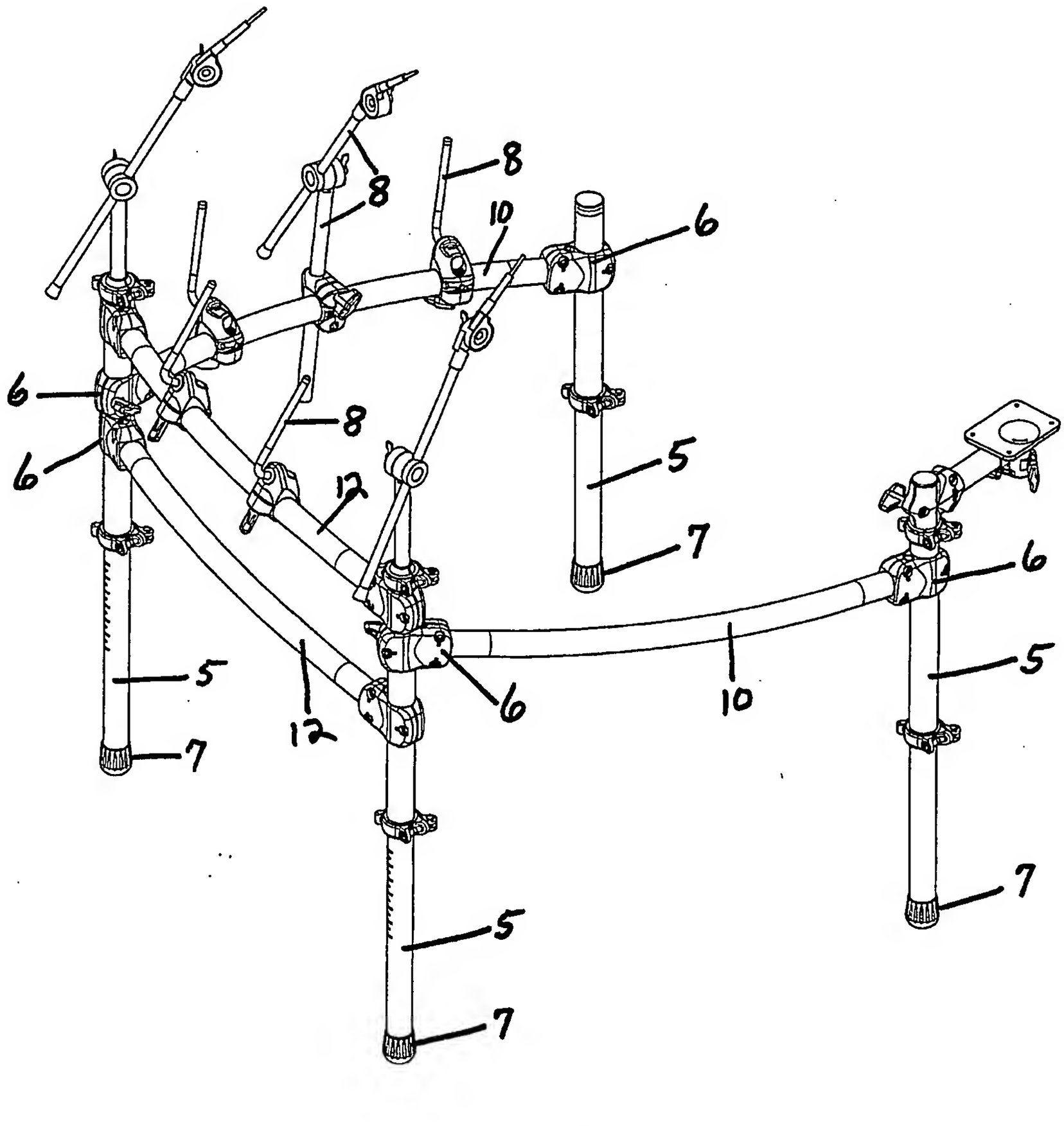

FIG. 6

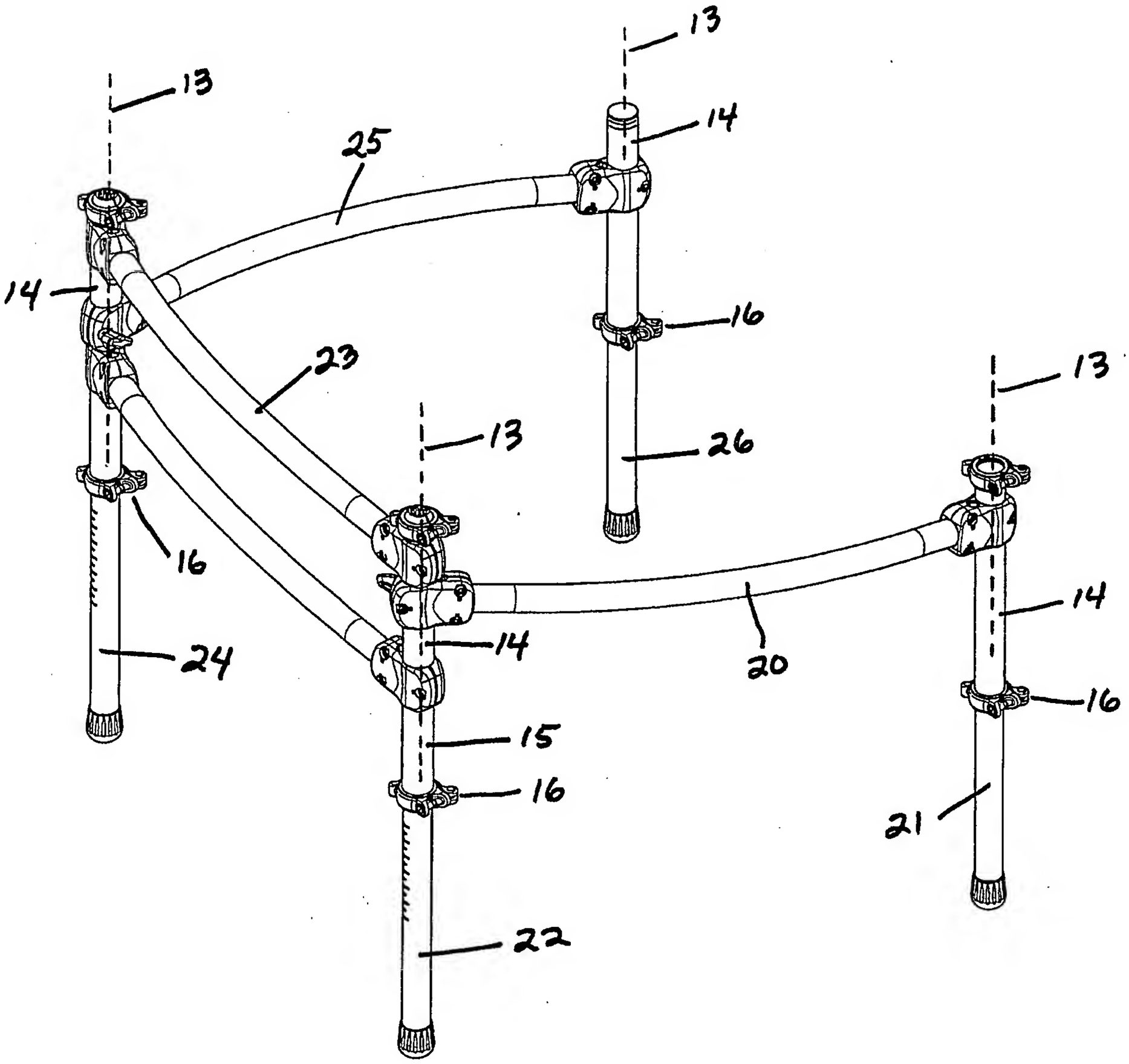

FIG. 7

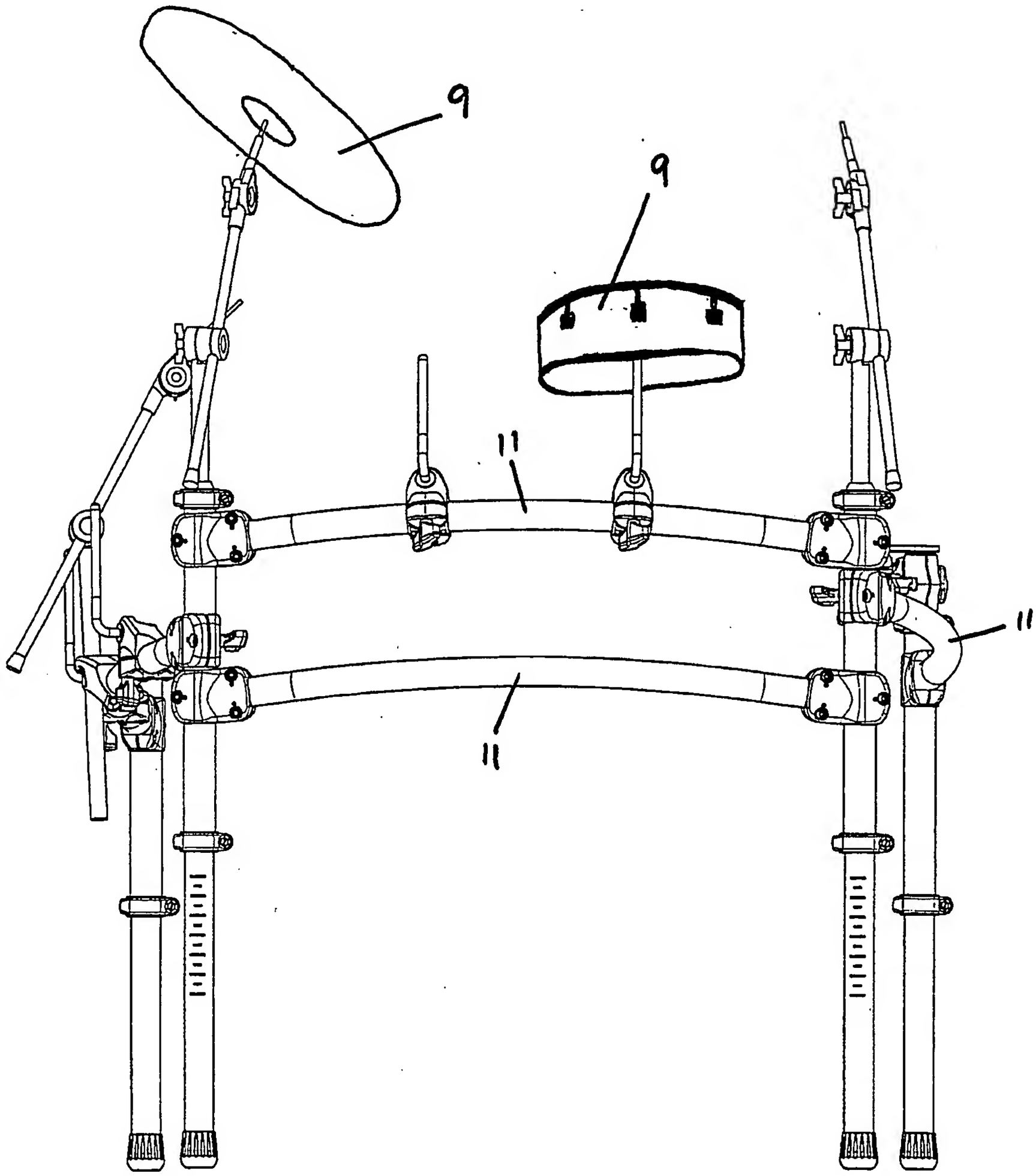

FIG. 8

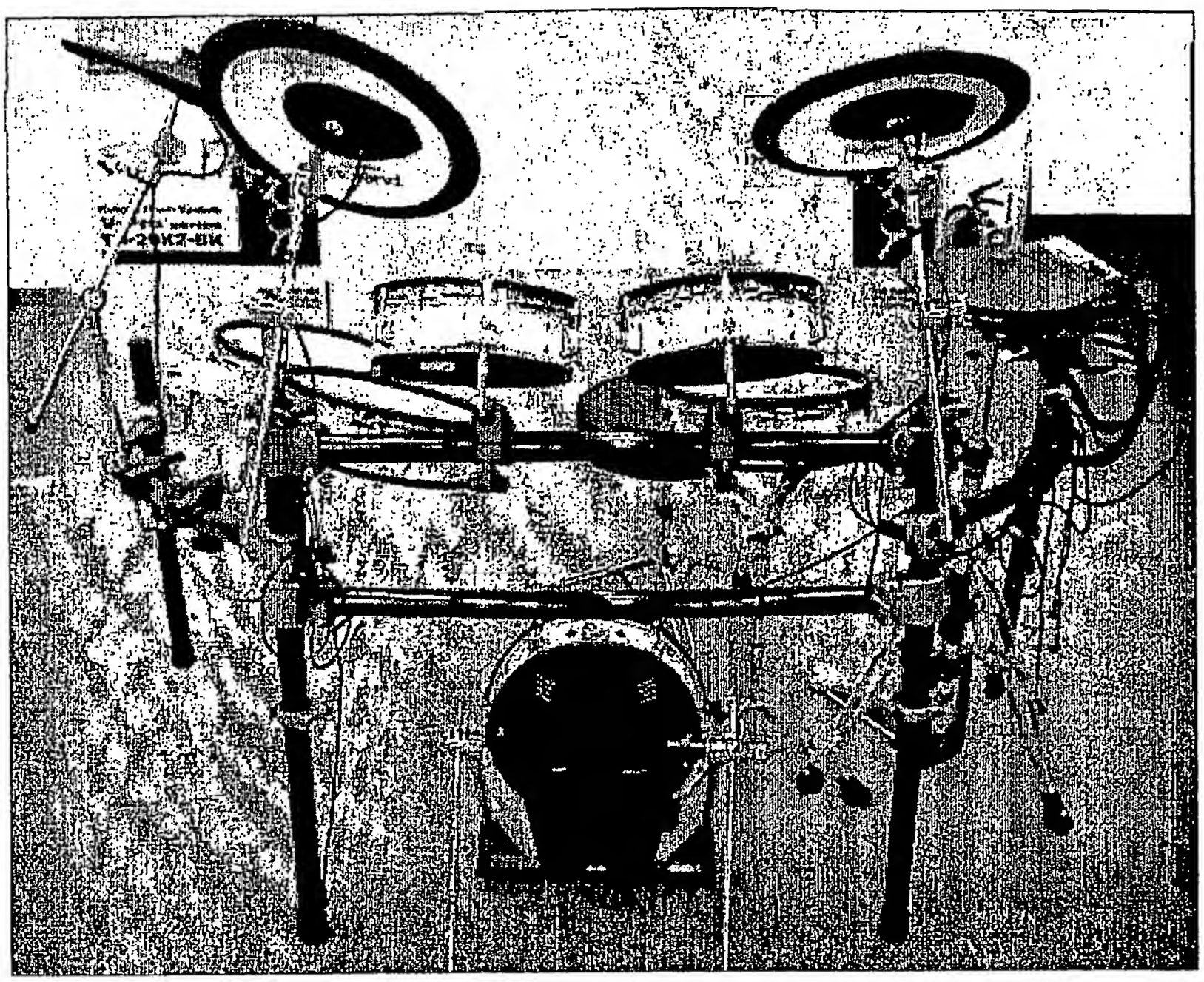

FIG. 9

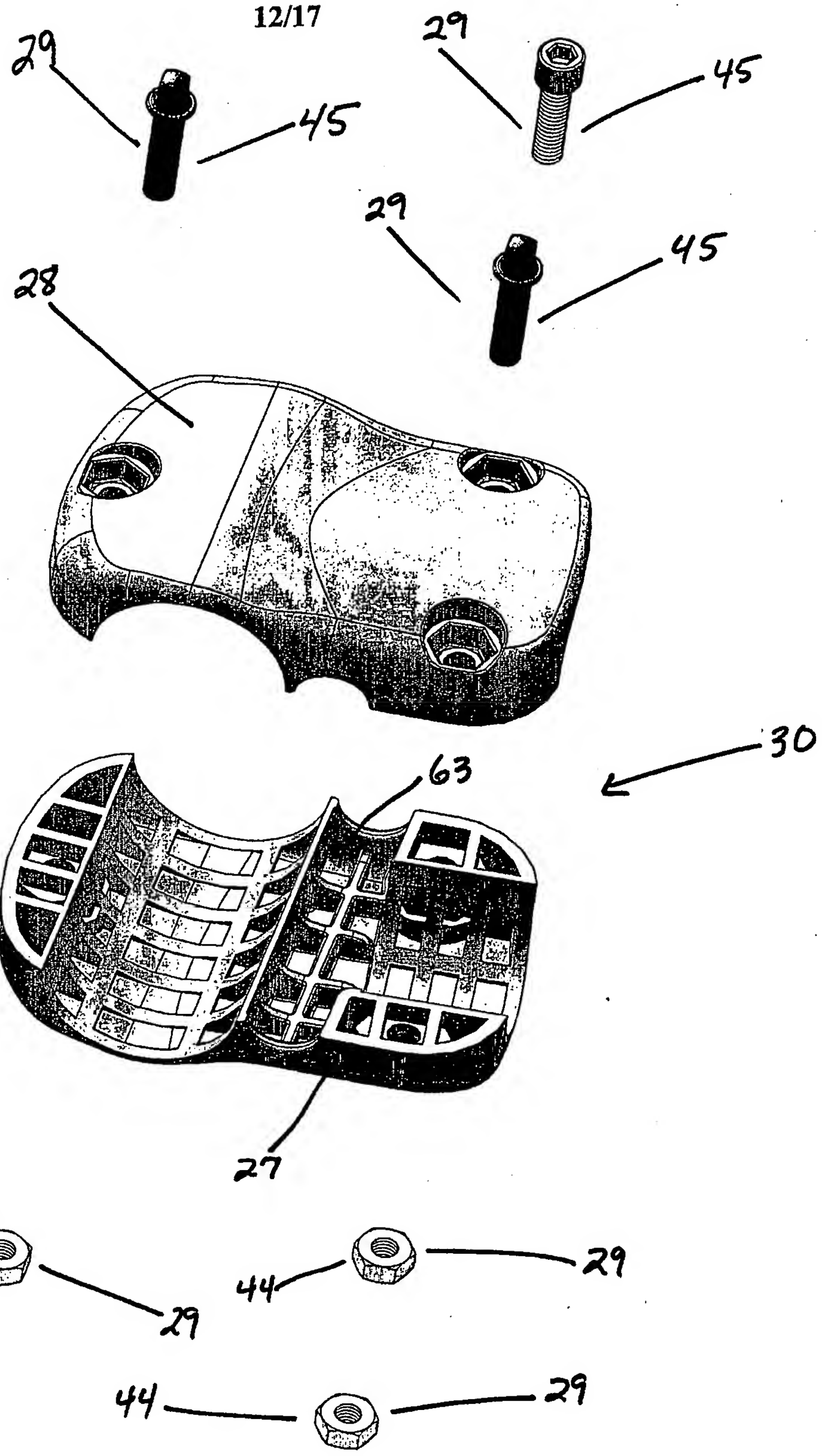

FIG. 10

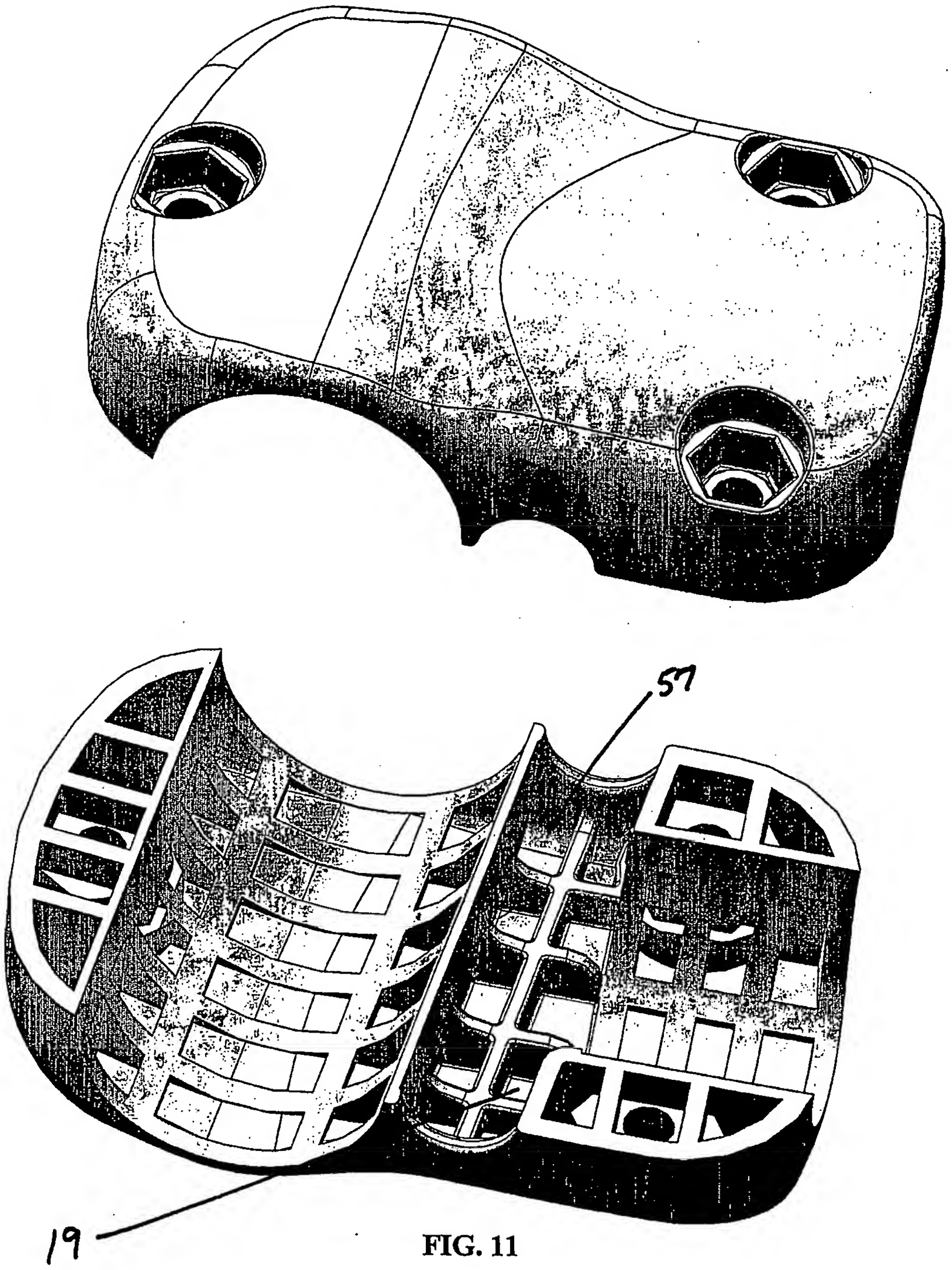

FIG. 11

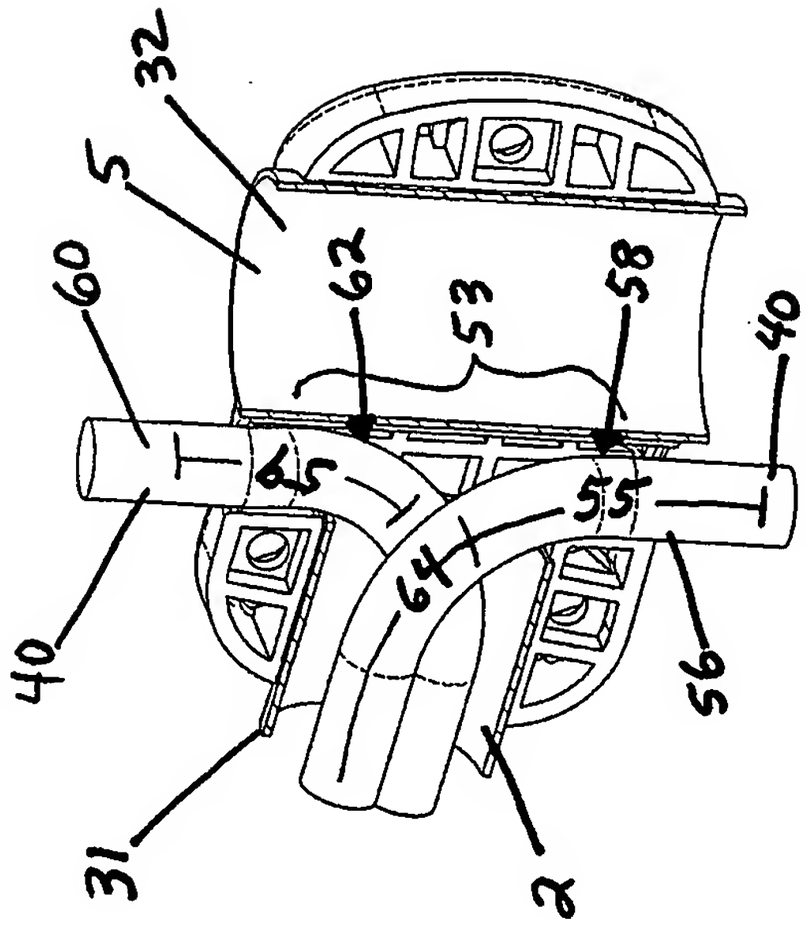

FIG 12a

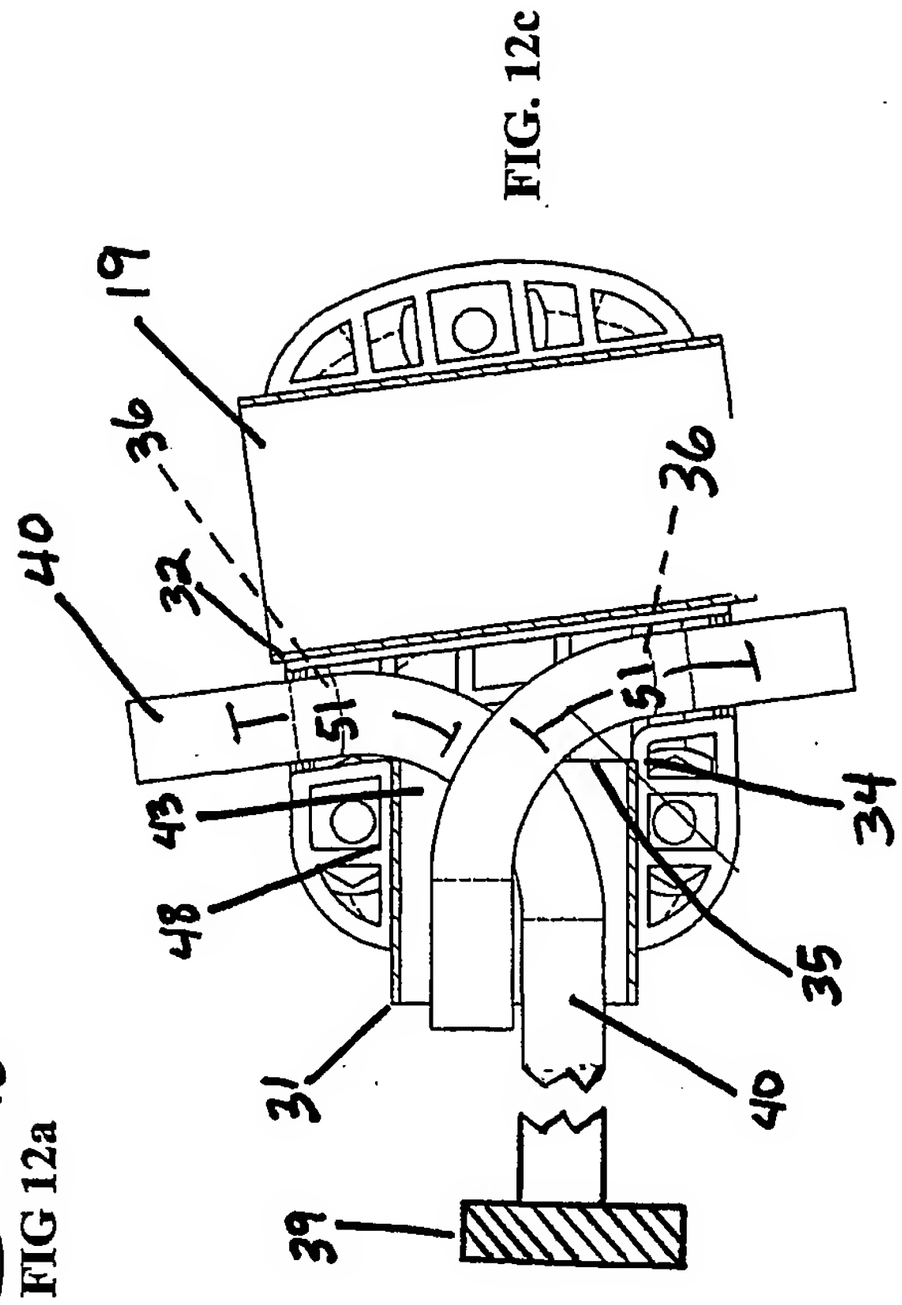

FIG. 12b

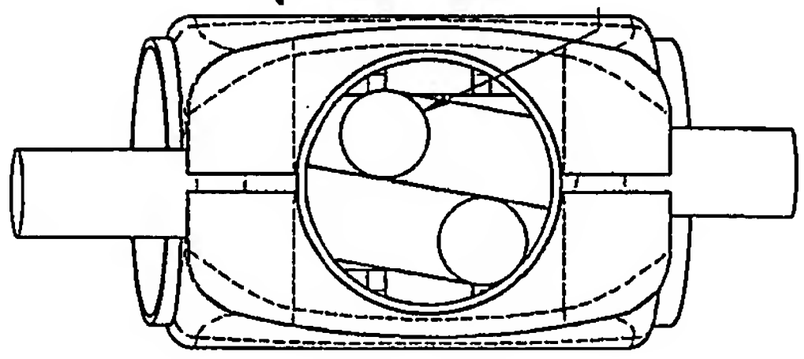

FIG. 12c

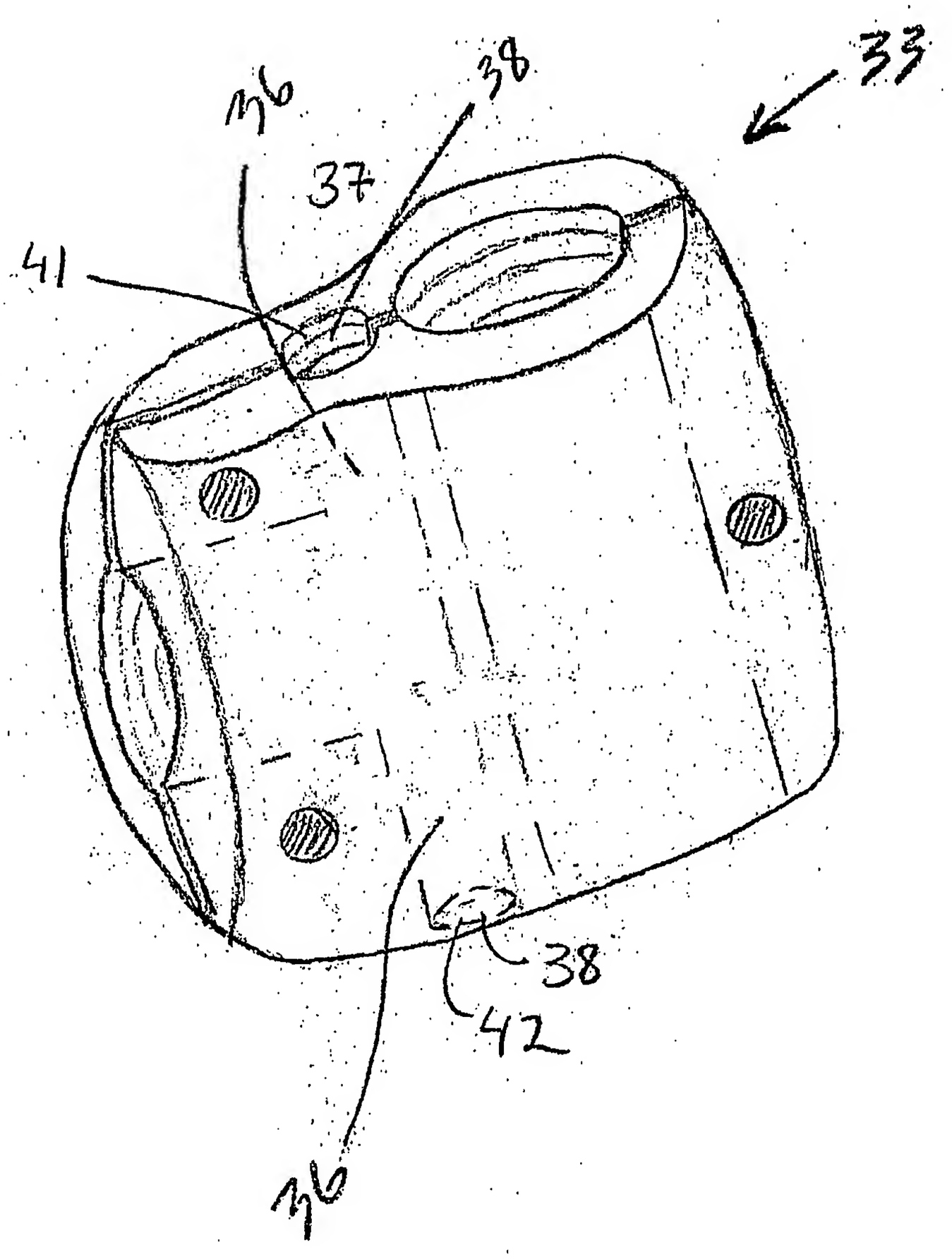

FIG. 13

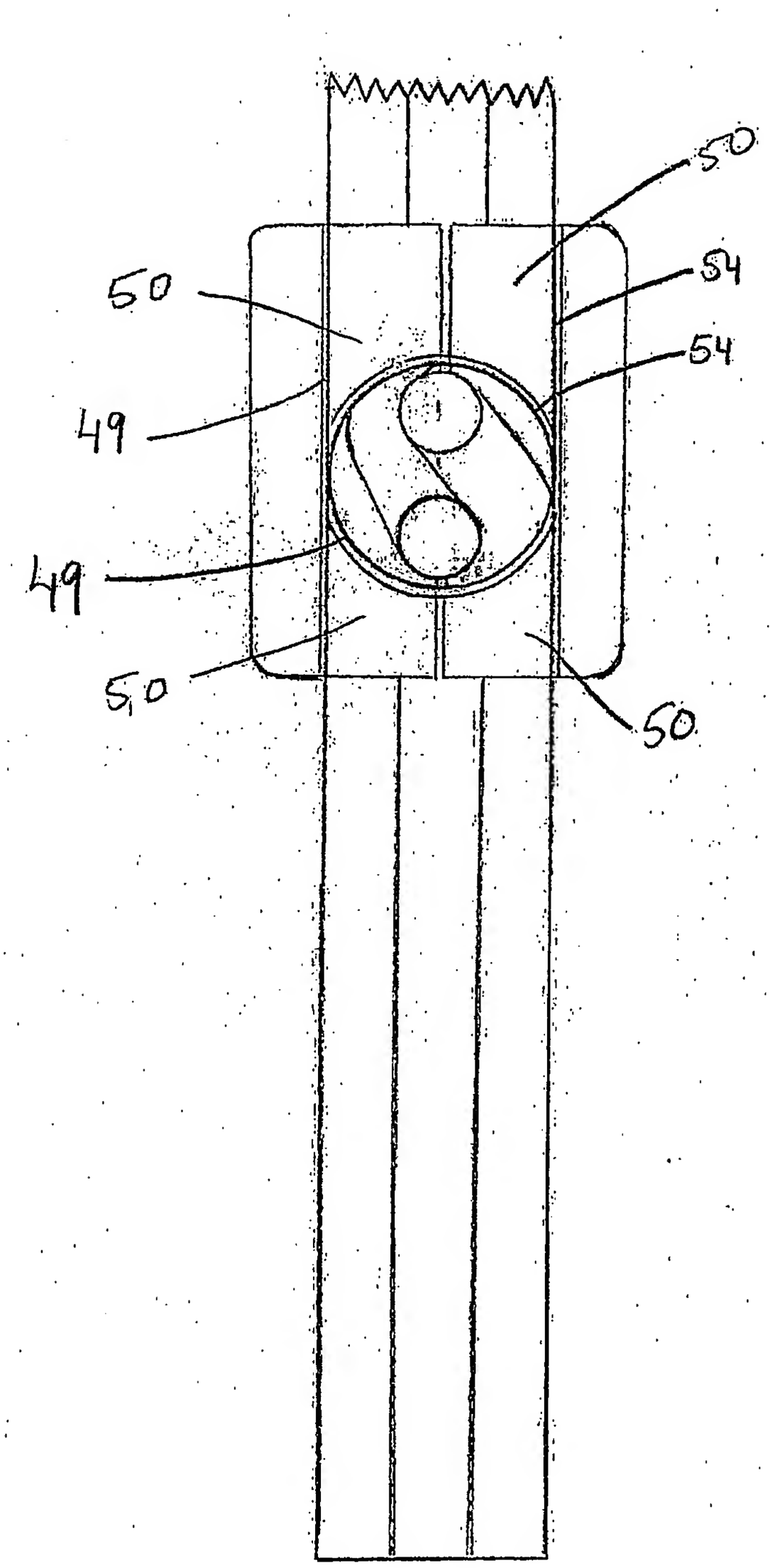

FIG. 14

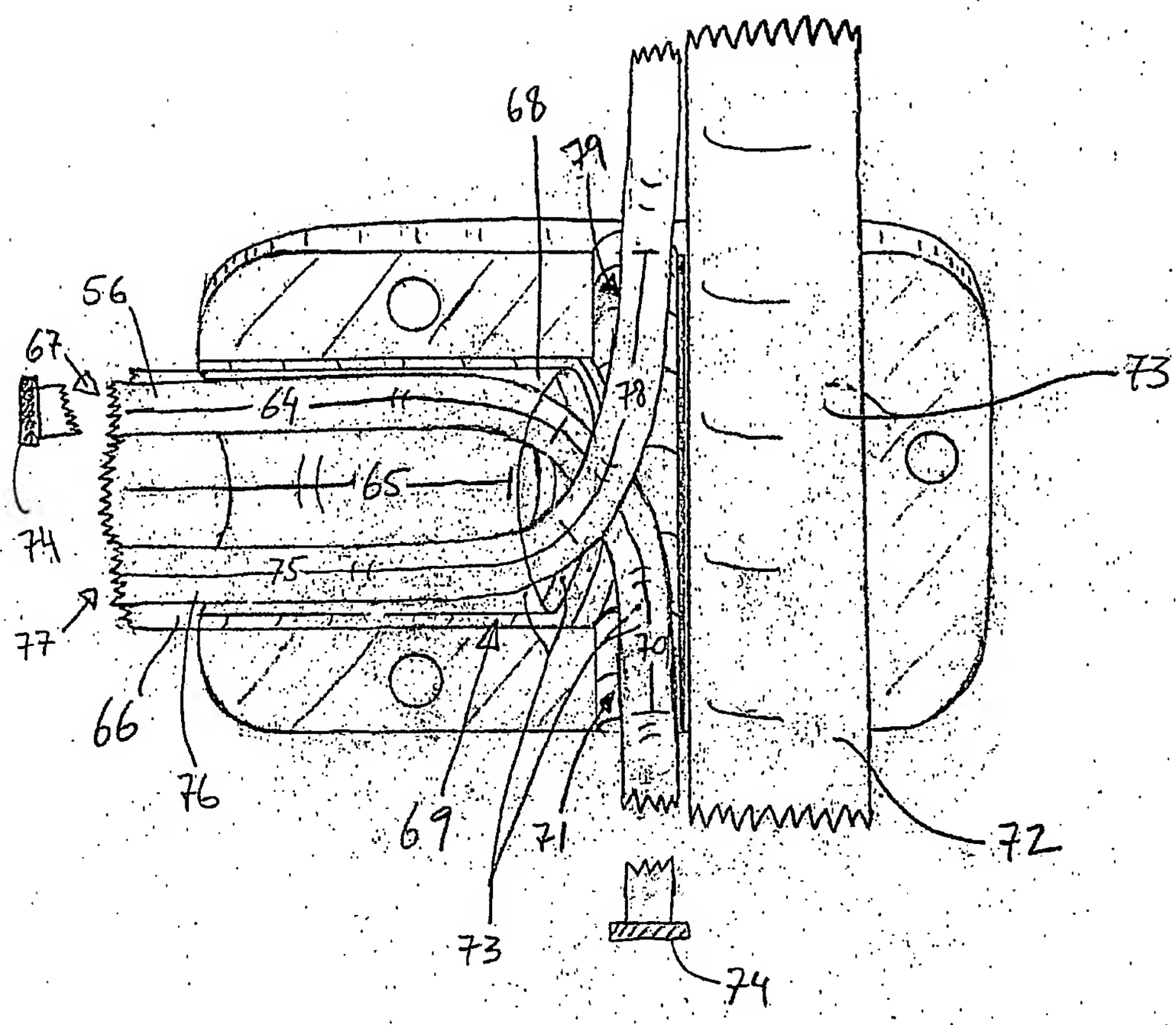

FIG. 15